WHAT IS CLAIMED IS:

1. A method of manufacturing a semiconductor device, comprising:

forming a crystalline semiconductor layer by heating an amorphous semiconductor layer on a substrate that has an insulating surface;

introducing an impurity of one conductivity type into the crystalline semiconductor layer;

irradiating the crystalline semiconductor layer with laser light to melt and re-crystallize the crystalline semiconductor layer for re-distribution of the one conductivity type impurity;

removing a high concentration impurity region where the one conductivity type impurity is segregated on a surface portion of the crystalline semiconductor layer, thereby leaving a portion of the crystalline semiconductor layer; and

forming a channel portion of an insulated gate field effect transistor from the remaining portion of the crystalline semiconductor layer.

2. A method of manufacturing a semiconductor device, comprising:

forming, an amorphous semiconductor layer on a substrate that has an insulating surface, an impurity region that contains an impurity of one conductivity type;

irradiating the amorphous semiconductor layer with laser light to melt and crystallize the amorphous semiconductor layer and distribution of the one conductivity type impurity;

removing a high concentration impurity region where the one conductivity type impurity is segregated on a surface portion of the crystalline semiconductor layer, thereby leaving a portion of the crystalline semiconductor layer; and

forming a channel portion of an insulated gate field effect transistor from the

remaining portion of the crystalline semiconductor layer.

3. A method of manufacturing a semiconductor device, comprising:

forming a crystalline semiconductor layer by heating an amorphous semiconductor layer on a substrate that has an insulating surface after adding a metal element for accelerating crystallization thereto;

introducing an impurity of one conductivity type into the crystalline semiconductor layer;

irradiating the crystalline semiconductor layer with laser light to melt and re-crystallize the crystalline semiconductor layer for re-distribution of the one conductivity type impurity;

removing a high concentration impurity region where the one conductivity type impurity is segregated on a surface portion of the crystalline semiconductor layer, thereby leaving a portion of the crystalline semiconductor layer; and

forming a channel portion of an insulated gate field effect transistor from the remaining portion of the crystalline semiconductor layer.

4. A method of manufacturing a semiconductor device, comprising:

forming a crystalline semiconductor layer by irradiating an amorphous semiconductor layer on a substrate that has an insulating surface with a pulse laser light to partially or entirely crystallize the amorphous semiconductor layer;

introducing an impurity of one conductivity type into the crystalline semiconductor layer;

irradiating the crystalline semiconductor layer with laser light to melt and

re-crystallize the crystalline semiconductor layer for re-distribution of the one conductivity type impurity;

removing a high concentration impurity region where the one conductivity type impurity is segregated on a surface portion of the crystalline semiconductor layer, thereby leaving a portion of the crystalline semiconductor layer; and

forming a channel portion of an insulated gate field effect transistor from the remaining portion of the crystalline semiconductor layer.

5. A method of manufacturing a semiconductor device according to claim 1, wherein a source of the laser light is one selected from a continuous wave YAG laser, YVO_4 laser, YLF laser, and $YAlO_3$ laser.

6. A method of manufacturing a semiconductor device according to claim 2, wherein a source of the laser light is one selected from a continuous wave YAG laser, YVO_4 laser, YLF laser, and $YAlO_3$ laser.

7. A method of manufacturing a semiconductor device according to claim 3, wherein a source of the laser light is one selected from a continuous wave YAG laser, YVO_4 laser, YLF laser, and $YAlO_3$ laser.

8. A method of manufacturing a semiconductor device according to claim 4, wherein a source of the laser light is one selected from a continuous wave YAG laser, YVO_4 laser, YLF laser, and $YAlO_3$ laser.

9. A method of manufacturing a semiconductor device according to claim 1, wherein 40 nm or more of the thickness of the high concentration impurity region where the one conductivity type impurity is segregated on the front side of the crystalline semiconductor layer is removed.

10. A method of manufacturing a semiconductor device according to claim 2, wherein 40 nm or more of the thickness of the high concentration impurity region where the one conductivity type impurity is segregated on the front side of the crystalline semiconductor layer is removed.

11. A method of manufacturing a semiconductor device according to claim 3, wherein 40 nm or more of the thickness of the high concentration impurity region where the one conductivity type impurity is segregated on the front side of the crystalline semiconductor layer is removed.

12. A method of manufacturing a semiconductor device according to claim 4, wherein 40 nm or more of the thickness of the high concentration impurity region where the one conductivity type impurity is segregated on the front side of the crystalline semiconductor layer is removed.

13. A method of manufacturing a semiconductor device, comprising:

forming an amorphous semiconductor layer having a thickness of 60 nm or more;

crystallizing the amorphous semiconductor layer to obtain a crystalline semiconductor layer;

introducing an impurity element into the crystalline semiconductor layer by accelerating the impurity element with the acceleration voltage 30 kV or less

irradiating the crystalline semiconductor layer with laser light after introducing the impurity element whereby the crystalline semiconductor layer is re-crystallized;

removing a surface portion of the crystallize semiconductor layer which is re-crystallized.

14. A method of manufacturing a semiconductor device according to claim 13, wherein a method for crystallizing the amorphous semiconductor layer is selected from one of furnace annealing, radiant heat method and gas heat method rapid thermal annealing.

15. A method of manufacturing a semiconductor device according to claim 13, wherein a source of the laser light is one selected from a continuous wave YAG laser, YVO_4 laser, YLF laser, and $YAlO_3$ laser.

16. A method of manufacturing a semiconductor device according to claim 13, wherein a thickness of the surface portion of the crystalline semiconductor layer removed is 10 nm to 50nm.

17. A method of manufacturing a semiconductor device according to claim 13, further comprising: patterning the crystalline semiconductor layer to form an island shape.

18. A method of manufacturing a semiconductor device according to claim 13, wherein a concentration of the impurity element in the crystalline semiconductor layer is 1 x

10^{15} to 5 x 10^{18} /cm^3 and in the range of the concentration being ± 10% for an average.

19. A method of manufacturing a semiconductor device, comprising:

forming an amorphous semiconductor layer having a thickness of 60 nm or more;

introducing an impurity element into the crystalline semiconductor layer by accelerating the impurity element with the acceleration voltage 30 kV or less

irradiating the amorphous semiconductor layer with laser light after introducing the impurity element whereby the crystalline semiconductor layer is crystallized;

removing a surface portion of the crystallize semiconductor layer.

20. A method of manufacturing a semiconductor device according to claim 19, wherein a source of the laser light is one selected from a continuous wave YAG laser, YVO_4 laser, YLF laser, and $YAlO_3$ laser.

21. A method of manufacturing a semiconductor device according to claim 19, wherein a thickness of the surface portion of the crystalline semiconductor layer removed is 10 nm to 50nm.

22. A method of manufacturing a semiconductor device according to claim 19, further comprising: patterning the crystalline semiconductor layer to form an island shape.

23. A method of manufacturing a semiconductor device according to claim 19, wherein a concentration of the impurity element in the crystalline semiconductor layer is 1 x 10^{15} to 5 x 10^{18} /cm^3 and in the range of the concentration being ± 10% for an average.

24. A method of manufacturing a semiconductor device according to claim 1, wherein a concentration of the impurity element in the crystalline semiconductor layer is 1 x 10^{15} to 5 x 10^{18} /cm^3 and in the range of the concentration being ± 10% for an average.

25. A method of manufacturing a semiconductor device according to claim 2, wherein a concentration of the impurity element in the crystalline semiconductor layer is 1 x 10^{15} to 5 x 10^{18} /cm^3 and in the range of the concentration being ± 10% for an average.

26. A method of manufacturing a semiconductor device according to claim 3, wherein a concentration of the impurity element in the crystalline semiconductor layer is 1 x 10^{15} to 5 x 10^{18} /cm^3 and in the range of the concentration being ± 10% for an average.

27. A method of manufacturing a semiconductor device according to claim 4, wherein a concentration of the impurity element in the crystalline semiconductor layer is 1 x 10^{15} to 5 x 10^{18} /cm^3 and in the range of the concentration being ± 10% for an average.